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ABSTRACT

The RAND Critical Technologies Institute (CTI) was asked to report on the progress federal agencies have made and the problems encountered in implementing Executive Order 12999, which streamlines the transfer of excess and surplus federal computers to schools and nonprofit organizations. This documented briefing presents the findings from that review and discusses private-sector, nonprofit, and state-sponsored programs that transfer used computer equipment to elementary and secondary schools. Findings from the study include: (1) schools can benefit from donated computers--refurbished used computers can extend limited school budgets and speed up the process of bringing educational technology into the classroom; (2) transferring equipment in good working order is essential--gifts of nonworking equipment are usually counterproductive for both donors and recipients; (3) refurbishing provides more and better equipment for schools--recyclers report that only 25-35% of the donated computers they receive can be transferred as is, so refurbishing increases usable output to 65-70% of incoming donations, and recyclers can often upgrade donated machines; (4) independent recycling organizations can operate at larger scale than individual donors or recipients; and (5) recycling organizations offer advantages, but other approaches to refurbishing also seem feasible. If properly managed, recycling programs can add substantially to the number of capable computers in elementary and secondary school classrooms. (SWC)

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Computer Donations to Schools

*A Review of Selected Private-Sector,
Nonprofit and State Programs*

Walter S. Baer, Gwendolyn Farnsworth

Critical Technologies Institute

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DOCUMENTED BRIEFING

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Computer Donations to Schools

*A Review of Selected Private-Sector,
Nonprofit and State Programs*

Walter S. Baer, Gwendolyn Farnsworth

*Prepared for the
Office of Science and Technology Policy*

Critical Technologies Institute

PREFACE

Executive Order 12999, signed in April 1996, streamlines the transfer of excess and surplus federal computer equipment to schools and nonprofit organizations. In response to a request from Congress, the Office of Science and Technology Policy (OSTP) asked the RAND Critical Technologies Institute (CTI) in November 1996 to report on the progress federal agencies have made and the problems they have encountered in implementing this Executive Order.

In addition to the examination of federal agency activities, CTI conducted a brief review of selected private sector, nonprofit and state government programs that transfer used computers to schools. This documented briefing presents the findings from that review. It is a companion piece to the overall CTI study report.[1]

CTI was created in 1991 by an act of Congress. It is a federally funded research and development center (FFRDC) operated by RAND, whose mission is to:

- provide analytical support to the Executive Office of the President,
- help decisionmakers understand the likely consequences of their decisions and choose among alternative policies, and
- improve understanding in both the public and private sectors of the ways in which technological efforts can better serve national objectives.

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[1] Thomas K. Glennan, Jr., Walter S. Baer, Susanna Purnell, Gwendolyn Farnsworth and Gina Schuyler, *Surplus Federal Computers for Schools: An Assessment of the Early Implementation of E.O. 12999*, RAND, MR-871-OSTP, 1997.

SUMMARY

This documented briefing discusses private-sector, nonprofit and state-sponsored programs that transfer used computer equipment to elementary and secondary schools. There are literally thousands of such programs in the United States which in total provide more than 100,000 computers annually, or roughly 10 percent of all the computers acquired by K-12 schools.

Until recently, most gifts have involved a direct transfer between an individual or corporate donor and a school recipient. Donors have found, however, that schools need considerable support to properly install, maintain and operate the donated computers. This has led in some cases to unanticipated repair and administrative costs to donors or, in other cases, to less-than-expected goodwill from their donations. For their part, educators all too often report that donated equipment is obsolete, arrives broken or is missing crucial components such as keyboards or disk drives. Such donations are usually discarded, although they sometimes are useful for training vocational students in basic computer repair.

These problems have encouraged many private firms to donate used equipment through third-party, nonprofit computer recycling or intermediary organizations. A typical recycler receives donated equipment; checks to see whether it is in working order or repairable; replaces missing components; repairs, refurbishes and/or upgrades it; and arranges delivery to the recipient. This relieves the donor of the responsibility and cost of ensuring that donated computers are operational. Many, although not all, recyclers warrantee or guarantee replacement of the equipment they transfer, typically for one year. Other organizations simply act as intermediaries and require donors to ensure the equipment is in working order.

Recyclers vary widely in their scale of operation, geographic scope, sources of equipment donations and funding, arrangements for refurbishing, selection of recipients, and arrangements with recipients and other organizations. Most nonprofit recyclers are very small, but some have grown to handle thousands of computers annually. California, Indiana and a few other states now provide state funds or other support for computer recycling to schools.

This review leads to several findings that may help federal agencies improve their computer donations under EO 12999:

1. Schools can benefit from donated computers. While donations of used equipment should not replace funds for new purchases, refurbished used computers can extend limited school budgets and speed up the process of bringing educational technology into the classroom. A properly refurbished, donated used computer should cost roughly one-quarter to one-third that of an equivalent new machine. Schools certainly need multimedia, Internet-capable computers in classrooms, but they can also make productive use of less advanced machines for some classroom applications and for many administrative tasks. Like other organizations, schools need a technology plan so that they can allocate both old and new computers to appropriate applications.
2. Transferring equipment in good working order is essential. Gifts of nonworking equipment are usually counterproductive for both donors and recipients. While this may seem an obvious statement, many teachers and school administrators can readily cite examples of receiving inoperable or incomplete donations that were of no use to them. Some schools or districts have computer repair capabilities in their vocational programs and will accept nonworking equipment as training material for vocational classes. However, the majority of schools want donations of complete working systems that will operate reliably upon delivery.
3. Refurbishing provides more and better equipment for schools. Recyclers report that, at most, 25 to 35 percent of the donated computers they receive can be transferred as-is. The rest are missing key components, need repair, or must be disassembled for parts that can be used in other machines. If the recycler has funds to buy additional parts and components, the usable output can be doubled to 65-70 percent of incoming donations. Moreover, recyclers can often upgrade donated computers into more capable machines that are more suitable for classroom instruction.

4. Independent recycling organizations can operate at larger scale than can individual donors or recipients. This gives them potential advantages in terms of lower operating costs, more consistent output, the ability to negotiate better software licenses, wider distribution and better knowledge of recipients' needs.

5. Recycling organizations offer advantages, but other approaches to refurbishing also seem feasible. Recyclers that transfer thousands of good-quality computer systems annually may well have greater educational impact than do smaller donation programs. However, some donors and recipients may prefer to take responsibility themselves for ensuring that teachers and other school users receive donated computers in good working order. School districts may want to run their own refurbishing operations as part of their vocational education programs, both to help vocational students learn marketable skills, and to exercise greater control over placement of the refurbished equipment. Other community-based models for refurbishing may also prove feasible but are as yet untested.

Nonfederal donations to schools have changed markedly in the past two years. Current recycling programs emphasize refurbishing and upgrading computers that can run multimedia software and access the Internet. Many of the concerns about donations that we heard from teachers and school administrators seem to reflect earlier experiences with direct donations of equipment that were not useful for classroom instruction. Recycling programs are certainly not the full solution to schools' technology needs, but if properly managed, they can add substantially to the number of capable computers in elementary and secondary school classrooms.

Computer Donations to Schools

A Review of Selected Private Sector, Nonprofit and State Programs

June 1997

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RAND

Outline of Presentation

- Study background and approach
- Benefits of computer donations
- Direct donation and refurbishment programs
- Approaches to recycling and refurbishment
- Summary and final observations

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This briefing presents a review of selected nonfederal computer donation and "recycling" programs for elementary and secondary schools, and their potential contribution to schools' needs for classroom computers. It was undertaken as part of a larger CTI study of federal agency computer donations to schools under Executive Order 12999.

After describing the study's background and approach, we outline the benefits of computer donations from the perspective of both school recipients and donors. The next section of the presentation compares direct donor-to-recipient gifts with those that involve refurbishment of the used equipment by third-party recycling or other organizations. We then describe several of the larger recycling organizations, including those associated with state-funded programs in California and Indiana. Other approaches to refurbishment of computer equipment are also discussed.

The final section of the briefing summarizes our findings and presents a few concluding observations that seem relevant to federal agency donation programs.

Are Computer Donations Useful To Schools?

- **Presidential initiative to expand K-12 use of technology**
 - more computers in the classroom
 - every classroom connected to the Internet by 2000
- **Schools have limited resources to buy computers**
- **Donations could place more computers in schools**
 - many computer donation programs already in place
 - EO 12999 encourages federal transfers to schools
- **But some question the value of computer donations**
 - do used or refurbished computers work reliably?
 - are they really useful in the classroom?

3 7/97 10:10 AM RAND

In his 1997 State Of The Union Address, President Clinton reaffirmed his Administration's commitment to expand the use of computers in elementary and secondary school classrooms and connect them to the Internet. In the President's words, "every 12-year-old must be able to log on to the Internet," with a national goal to "connect every classroom and library to the Internet by the year 2000."

Although investments in educational technology are steadily increasing, most schools and school districts find their funds inadequate to properly equip classrooms with new computers. A 1996 survey by Quality Education Data, Inc. (QED) shows that, on average, K-12 classrooms in the United States had one multimedia computer for every 24 students. In California, that ratio was one multimedia computer per 37 students – a far cry from the State goal of one advanced, Internet-capable computer for every four students.

Bringing Internet-capable used computers into classrooms is one possible way to bridge the current "computer gap," and many programs have sprung up around the country to encourage corporate and individual donations of used computers to schools. Federal Executive Order 12999, signed in April 1996, is intended to facilitate the transfer of surplus federal computers to schools. But issues have been raised about the value of donated used computers to schools. Do donated used or refurbished computers work reliably? Are they suitable to run the latest educational software, and for other classroom activities? These are some of the questions we addressed.

Why Review Private Sector and Nonprofit Donation Programs?

- Identify exemplary computer donation programs
- Explore cooperative arrangements among private, nonprofit and public organizations
- Assess school responses to donations
- Identify major problems, and how they have been addressed
- Draw lessons for federal donation programs

4 71987 10-10-90 RAND

Although the CTI study focused on federal computer donations, we also thought it important to examine donation and recycling programs involving private sector, nonprofit and state and local government organizations. A review of nonfederal activities helps us understand how useful computer donations are to bridging the classroom computer gap and provides some yardsticks with which to compare federal programs.

We looked for examples of particularly effective programs in order to develop a sense of current "best practices" for computer donations. In the past, most, gifts have involved a direct transfer between an individual or corporate donor and a school recipient. Recently, however, "computer recycling" or other intermediary organizations have been established to facilitate donations to schools; and various collaborative arrangements have arisen among private firms, nonprofits and state or local government organizations.

We also sought to understand how computer donations were perceived by school recipients, and what made donation or recycling programs more or less useful to schools. Here we were especially interested in identifying problems that have arisen, from either the donor's or recipient's perspective; and how such problems have been addressed and resolved.

Finally, we hoped to draw lessons from the nonfederal experience that would inform and improve federal agency efforts to transfer surplus computers to schools under EO 12999.

Study Approach

- Identify corporate and foundation donation programs from Web listings and personal contacts
 - found literally thousands of donors/recyclers, but most are small (< 100 per year)
- Focus on a few larger programs
 - conduct case studies rather than surveys
 - use California and Indiana as contrasting models
- Interview donors, recycling and other intermediary organizations, school recipients

5/7/97 10:10 AM RAND

There are now literally thousands of computer donation or recycling programs in the U.S.; and with only three months to conduct this review, we clearly had to focus our efforts. We first identified donation/recycling programs that have a presence on the World Wide Web* or were recommended to us from other sources. Most of these programs handle fewer than 100 computers a year and appear too small to serve as donation models for federal agencies.

Consequently, rather than trying to survey the entire universe of donors and recyclers, or to interview a representative sample of them, we concentrated on programs that transfer at least several hundred computers to schools each year. We further focused on organizations with a national scope, and on two state-sponsored recycling programs in California and Indiana that have quite different approaches to transferring used computers to schools. Using a common set of questions, we conducted telephone interviews with donors, recycling and other intermediary organizations, state agencies in California and Indiana, school districts and school recipients.

* A listing of such programs can be found at
http://www.microweb.com/pepsite/Recycle/recycle_index.html

Key Research Questions

- What are the benefits and costs to donors and recipients of computer donations?
- Are there advantages to third-party refurbishment of used computers over direct donations?
- What organizational arrangements for refurbishment seem to work best?

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Three key research questions about computer donations are shown in this chart. They address:

1. the benefits and costs to donors and recipients;
2. the advantages (if any) of refurbishment by third parties over direct donations; and
3. the kinds of institutional arrangements that seem most productive.

We asked these questions in our interviews with business firms, nonprofit organizations, schools and state government organizations involved in computer donations.

Organizations Interviewed (partial list)

Private Sector

Ameritech
Apple Computer
Eli Lilly
Hughes Electronics
IBM
Intel
Microsoft
Pacific Bell
Software Publ. Assoc.

Nonprofit Organizations

Computer Recycling Center
Detwiler Foundation
East-West Ed. Dev. Found.
Gifts In Kind
Lazarus Foundation
National Cristina Foundation

State Programs

CA Comp. Refurbishing Fund
Indiana Buddy-Up Program

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This chart lists a number of the private sector, nonprofit and state organizations that we interviewed. Their comments and experience are reflected in the discussion that follows.

Outline of Presentation

- Study background and approach
- **Benefits of computer donations**
- Direct donation and refurbishment programs
- Approaches to recycling and refurbishment
- Summary and final observations

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This section of the briefing discusses the benefits of computer donations from the perspective of school recipients and donors.

Schools Can Benefit From Donated Computers

- **Donations can extend school technology budgets**
 - **used computers in good working order cost about 1/3-1/4 the cost of equivalent new machines**
 - **supplies limited by organizational capabilities to repair and refurbish, not by used equipment supply**
- **Schools need advanced multimedia computers but can also use less-capable machines**
 - **386, old Macs still good for basic keyboarding, word processing and many administrative tasks**
 - **schools need a technology plan to make best use of less-capable as well as advanced computers**

9 7/1/87 10:10 AM RAND

While donations of used equipment should not replace funds for new purchases, used computers in good working order can extend limited school budgets and speed up the process of bringing educational technology into the classroom. A used computer should cost roughly one-quarter to one-third that of an equivalent new machine. Computer recycling organizations (to be discussed later in the briefing) typically use a 3/1 or 4/1 "rule of thumb" in deciding whether a donated machine should be refurbished or simply taken apart; that is, the system when transferred should be worth at least three or four times the cost of its repair and/or upgrading.

Schools certainly need multimedia, Internet-capable computers in classrooms, but they can also make productive use of less advanced machines for some applications. Older Macs and PCs are still useful for teaching keyboarding and basic writing skills, as well as for many administrative tasks. Like other organizations, schools need a technology plan so that they can allocate both old and new computers to appropriate applications. Some schools may want to receive donations only of multimedia computers, while others may accept less-capable but workable machines. Although beyond the scope of this review, we believe that developing and adopting a technology plan, including policies for accepting equipment donations, should be a priority for school districts and individual schools.

Donors Have Different Reasons for Giving Used Computers to Schools

- **Local community relations (e.g., donations to schools that employees' children attend)**
- **Better education of the local workforce**
- **General support of education**
- **Economic benefits to donor**
 - **establishing products in education market**
 - **tax deductions (not a major factor because most donated equipment has been fully depreciated)**
 - **special state tax credits (e.g., Indiana)**

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It soon became clear from our interviews that corporate donors had several different reasons for giving used computers to schools. Donors all spoke about educational improvement; but for some, this meant helping specific local schools that employees' children attended, while others emphasized the importance of computer training for students who might be hired after graduation. Still others -- principally very large companies -- saw used computer donations as part of their general corporate commitment to improving education on a regional, state or national basis.

Although donors may also realize economic benefits, these generally did not seem to be the primary force driving their gifts to schools. Both hardware and software suppliers want students to use their products as they learn to use computers, but such firms prefer to donate or sell new products at a discount than to give used ones to schools. Tax deductions also appear to be a relatively minor factor, since computers in business have short economic lifetimes, and most have been fully depreciated by the time they are donated. However, a few states have enacted special tax credits for computer donations to schools. In Indiana, state tax credits appeared to be an important motivator for corporate donations.

And, of course, every donor wants to improve its community relations and gain good will from its computer gifts to schools.

Effective Donation Programs Must Be Managed

- Donor must think through its objectives and approach
 - community relations vs educational improvement
 - how to find, select, communicate with recipients
 - maintain ongoing relationships with recipients?
 - willingness to commit resources to program
- Resources must be adequate to meet program goals
- Effective programs have visibility and commitment
 - often part of larger corporate education or community relations program
 - support by senior management essential

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The corporate donation programs we found to be most effective were those that had clearly thought through their objectives, approaches and organizational implications. They had addressed such questions as:

- o how do we balance community relations and educational improvement goals?
- o how do we find, select and communicate with recipients?
- o do we want continuing relationships with recipients?
- o how do we measure how well we're doing?
- o what resources are we willing to commit, beyond the donated equipment itself?

The staff time and other resources committed must be adequate to meet the program's goals. Ensuring that equipment transferred to schools is in good working order requires staff time and should be budgeted as part of the donation program. As discussed later in the briefing, many corporate donors have chosen to work primarily through recyclers in order to reduce the time and associated costs needed to manage their donations.

We also observed that effective donation programs had visibility within the organization and the active support of senior management. Generally, programs managed within a corporate education or community relations program had greater visibility and commitment than those run out of a technical or property management department. Such programs also tended to be more aware of and responsive to school needs.

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- Study background and approach
- Benefits of computer donations
- **Direct donation and refurbishment programs**
- Approaches to recycling and refurbishment
- Summary and final observations

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This section of the briefing compares direct donor-to-recipient gifts with those that include refurbishment of the used equipment by third-party recycling or other organizations.

Direct Donations Don't Work For Most Donors

- **Most corporate programs started by giving used equipment directly to selected schools**
- **Schools frequently called back for repairs or help, which posed problems for donors**
 - some donors want continuing relationships with school recipients, but many do not
 - schools relatively unsophisticated users
 - repairs, training are expensive (and unbudgeted)
 - facing internal budget pressures, donors often couldn't be responsive to school needs
- **Result: donations often brought bad, not good will**

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A common theme emerged from our interviews with donors. Corporate donation programs typically started by giving used computers directly to selected local schools and other nonprofit organizations. Very often, donors would soon hear back from school recipients that the gifted computers weren't working. Sometimes the computer had arrived in inoperable condition or without operating software. In other cases, the computer operated for a while and then malfunctioned. While many school districts now provide computer maintenance services, donated used computers often fall outside district maintenance contracts. Schools are then left to maintain donated equipment themselves.

Donors quickly realized that most school recipients were quite unsophisticated users who needed a great deal of support. Some corporate donors had employees who would volunteer their own time to install and repair donated computers, and train teachers to use them. A few companies were willing to pay for set up, repair and even training. But many firms found the need for continuing support to be an expensive (and unbudgeted) problem for them. Facing familiar budget pressures of their own, they were unable to provide computer support or otherwise be responsive to school recipients.

As a consequence, firms sometimes found that their gifts of used computers, although made with good intentions and in good faith, brought them not good will, but bad will.

One Successful Example of Direct Donation: Hughes Electronics

- Coordinated by Hughes Education Program
 - donated several hundred computers from 1993-96
 - Hughes "partner schools" given priority
- Program relied on employee volunteers to
 - check and repair computers before donation
 - help school recipients install and maintain them
- Empty offices at headquarters used for refurbishing
- Donation program ended in 1996 when Hughes outsourced its computers

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Nevertheless, direct computer donation programs can be successful. One good example is that run by the Education Program of Hughes Electronics Corporation. At the Hughes headquarters in Westchester, California, employee volunteers spent their lunch hours inspecting and, where necessary, repairing or refurbishing surplus computers before they were donated. Volunteers would then work with teachers and others at recipient schools to make sure the computers remained in good working order. Hughes had already established "partnership school" arrangements with many of the recipients, so that the computer donations were often part of an ongoing program of direct corporate assistance to local schools.

Hughes Electronics transferred several hundred computers to local schools in the three years from 1993 to 1996. However, the program ended in 1996 when Hughes outsourced most of its computer operations to another firm and consequently no longer had surplus equipment to donate.

Direct Donations Usually Don't Work for Schools

- Politically, schools can't refuse gifts from local donors
- Donated equipment often obsolete, incomplete or not in working order
 - keyboards, disks, monitors often missing
 - manuals, other documentation rarely included
- Schools must be able to repair donated equipment
 - donors usually not willing to warrantee or repair
 - can be good experience for vocational classes
 - but little money for new parts, supplies, software
- Even when working, donated equipment may not be compatible with other school hardware and software

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Teachers and school administrators we interviewed had mixed feelings about the value of donated used computers. While recognizing that used machines in good working order could often be useful in the classroom, many could recount instances in which donated equipment arrived broken or missing crucial components such as keyboards or disk drives. Other donations came without operating software or needed documentation. These donations are generally discarded, since they appear to cost more in time and money to repair than they are worth. Still, several school administrators told us they could not turn down donations from local businesses, even if they seemed of little or no value.

Some school districts, such as San Diego and Philadelphia, send donations to vocational classes where they can be useful for training students in basic computer repair. Vocational classes usually have scant funds to buy components or software, however, so they have limited ability to upgrade older donations into more capable machines for Internet or multimedia applications.

School officials also noted that most donations they receive are PCs, which are incompatible with the Apple computers widely used in classrooms. Although the donated PCs could be well employed for business or administrative functions, schools and school districts often do not have technology plans or processes in place to distribute donated computers to the places where they can be best used.

Transferring Equipment in Good Working Order Is Essential

- Gifts of nonworking equipment are counterproductive
- Donor can give "as-is" if school has repair capability
 - most schools still unsophisticated users
 - some vocational classes can repair or refurbish, but most lack flexible funds to do so
- Donor can commit to repair or refurbish when needed
 - most successful when donor wants continuing relationship with school and has knowledgeable staff willing to volunteer time
- Donor can work with recycling or intermediary organization

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Making sure that the equipment transferred to schools is in good working order is the single most important key to success. Gifts of nonworking computers are usually counterproductive for both donors and recipients. While this may seem an obvious statement, many teachers and school administrators can readily cite examples of receiving inoperable or incomplete donations that were of no use to them.

Some schools or districts have computer repair capabilities in their vocational programs and will accept nonworking equipment as training material for vocational classes. The San Diego Unified School District, for example, channels computer donations through its Regional Occupational Program, where students check out and repair the machines before they are transferred to other classrooms. However, the majority of schools want donations of complete working systems that will operate reliably upon delivery.

Some donors, like Hughes Electronics, have been willing to commit resources to repairing or refurbishing used equipment before it is donated. Generally, this seems related to the donor's interest in maintaining a continuing relationship with the recipient, as in school partnering or "adopt-a-school" programs.

A third option is for the donor to work with a third-party recycling or intermediary organization which will take responsibility for repair and refurbishment.

Many Private Donors Now Work With Computer Recycling Organizations

- Donor gives equipment to third-party recycling organization which
 - repairs and refurbishes equipment
 - delivers it to schools
 - often warrants or guarantees replacement
- Relieves donor of repair responsibility and costs
- Donor avoids other administrative costs

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Many private firms now donate used equipment through third-party, nonprofit computer recycling or intermediary organizations. A typical recycler receives donated equipment, checks to see whether it is in working order or repairable; replaces missing components (e.g., monitors or keyboards); repairs, refurbishes and/or upgrades it (e.g., with additional memory), and arranges delivery to the recipient. This relieves the donor of the responsibility and cost of ensuring that donated computers are in good working order. Moreover, many (although not all) recyclers warrantee or guarantee replacement of the equipment they transfer, typically for one year.

Recycling and intermediary organizations also reduce administrative costs to donors. Much time and effort can be spent in managing communications with recipients, and in identifying and selecting them, especially as awareness of the program spreads. Direct donors can easily find themselves having to prioritize and manage a waiting list of dozens to hundreds of potential recipients.

Refurbishing Provides More and Better Equipment for Schools

- Fewer than 35% of donated computers usable as-is
- Refurbishing can double usable yield to 65-70%
 - donations repaired or "remanufactured"
 - unusable equipment salvaged for parts
- Recyclers can also upgrade computer capability
 - install more memory, faster processor
 - add color monitor, modem, CD-ROM drive

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Recycling generally results in the transfer of larger quantities of used equipment, in better operating condition, than direct donations. Recyclers told us that, at most, 25 to 35 percent of the donated computers they receive can be transferred as-is. The rest are missing key components, need repair or must be disassembled for parts that can be used in other machines. If the recycler has funds to buy additional parts and missing components (such as monitors and keyboards), the usable output can be doubled to 65-70 percent of incoming donations.

Moreover, recyclers can often upgrade older computers into Internet-ready, multimedia units by adding more memory, faster processors, color monitors, modems and CD-ROM drives. This makes the computers much more suitable for instructional applications in the classroom.

Outline of Presentation

- Study background and approach
- Benefits of computer donations
- Direct donation and refurbishment programs
- **Approaches to recycling and refurbishment**
- Summary and final observations

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This section of the briefing describes some of the larger recycling organizations, including those associated with state-funded programs in California and Indiana, and discusses other approaches to computer equipment refurbishment.

What's Required for an Effective Recycling/Refurbishment Program?

- A regular stream of usable donated equipment
- Arrangements for equipment pickup and delivery
- Substantial warehouse and repair space
- Funds to purchase parts and expendable supplies
 - including monitors, keyboards, memory, mice
 - typical 386 to 486 upgrade uses \$200-300 in parts
- Skilled technical staff and/or trainers for volunteer and student refurbishers
- On-site management

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A recycler must essentially operate a small business. It must have:

- o a regular supply of usable donated equipment;
- o arrangements for equipment pickup and delivery;
- o substantial warehouse and repair space;
- o working capital, including funds to purchase parts and expendable supplies;
- o skilled technical staff and/or trainers for volunteer or student refurbishers; and
- o effective on-site management.

An organization missing any of these components will be limited in the extent of recycling it can accomplish. School vocational programs, for example, often lack discretionary funds to purchase new parts and supplies. They may be able to repair donated computers but be unable to upgrade them to meet current classroom needs. The recyclers we interviewed said that upgrading a donated 386 computer to 486 or greater capability typically requires \$200-300 in additional parts or components (such as a color monitor).

Examples of Computer Recycling/Refurbishing Programs

- **Detwiler Foundation and the California State Refurbishing Fund**
- **Computer Recycling Center (Santa Clara, CA)**
- **Indiana Buddy-Up Program**
- **East-West Education Development Foundation**
- **Lazarus Foundation (Baltimore, MD)**

Other organizations recycle computer components and materials

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Recyclers vary widely in their scale of operation, geographic scope, sources of equipment donations and funding, arrangements with donors about selection of recipients, and arrangements with recipients and other organizations. Most nonprofit recyclers are very small, but some have grown to handle thousands of computers annually. California, Indiana and a few other states now provide state funds or other support for computer recycling to schools. This chart lists five recycling organizations we interviewed, each of whose programs will be briefly described.

Other organizations specialize in disassembling used computer equipment, recycling usable components and selling the remainder for scrap.

Detwiler Foundation and the California State Refurbishing Fund

Detwiler Foundation placed about 17,000 recycled computers in California schools in 1996

- **Donations (386 or better) primarily from large firms**
- **Most refurbishing takes place in California prisons**
 - **State appropriated \$10 million for refurbishing in 1996; Governor has requested same for 1997**
 - **nonworking equipment repaired or cannibalized**
 - **machines upgraded when possible**
- **No costs to schools, but recipients generally must match gifts by obtaining their own donations**
- **Foundation expanding program to other states**

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The Detwiler Foundation, founded in 1991 to facilitate computer donations to California schools, has become the nation's largest computer refurbishing program for schools. In 1996 the foundation arranged for transfer of some 17,000 computers, most of which were refurbished by California prison inmates with state funds from a new \$10 million California Computer Refurbishing Fund (CCRF).

Detwiler receives most of its operating support and equipment donations from large corporations in California. The foundation has set minimum standards (currently 386 or better for Internet access; 486 or better for curriculum applications) for donations, and it can often upgrade donated computers into more capable machines. For example Detwiler and the CCRF rebuilt more than 1000 PCs around new Pentium processors donated by Intel Corporation. However, the foundation will also accept nonworking computers, which are either repaired or cannibalized for parts. The refurbished or upgraded computers are then transferred to schools at no cost and with a one-year replacement guarantee.

Donors may specify recipients and the method of distribution. The Detwiler Foundation encourages donors to adopt a "Matching Challenge" requirement in which schools match the computers they receive on a one-to-one basis with donations from other sources. The Matching Challenge is intended to ensure that schools are committed to the program and that the donated computers will actually be used.

The foundation is now expanding its recycling program to other states.

Issues Raised About the Detwiler Recycling Program

- Detwiler demands donor and refurbisher exclusivity
- Recipient schools not selected by need
 - but donors may request specific recipients
 - matching required to show school commitment
 - 1/1 matching relaxed in rural, low income cases
- Some schools object to matching requirement
 - can't match with gifts from large firms
 - Detwiler doesn't upgrade or warrantee matches
- Program relies on State funds for refurbishing
 - cost averages ~\$400 per computer placed
 - fundraising outside California not established

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The Matching Challenge is one of the more controversial aspects of the Detwiler program, because schools must obtain their matches from non-Detwiler sources (i.e., mostly from small companies and individuals), and the foundation does not refurbish or guarantee replacement of the matching computers. The matches must be 386 or better and in working order. The foundation will relax the matching requirement for rural, low income or other schools that find it difficult to solicit donations themselves.

Other concerns raised by educators about the Detwiler program include its political visibility and its potential to displace state and local funds for new technology purchases. Some say the State appropriation of \$10 million for the California Computer Refurbishing Fund would have been better spent on new equipment. However, the Detwiler Foundation believes its efforts have increased overall funding for school technology in California by focusing attention on schools' needs.

There appears to be high demand by schools for the recycled equipment, and the Detwiler Foundation now is probably the largest supplier of (new or used) computers to K-12 schools in California.

Computer Recycling Center

Nonprofit corporation in Santa Clara, CA, initially funded by Packard Foundation grant

- **Will take any computer equipment, in any condition**
 - usable equipment refurbished and given to schools
 - other components and materials recycled
- **Relies heavily on volunteers for refurbishing**
 - also certified as vocational training school
- **25,000 computers donated in past three years**
 - recipients primarily schools in California
- **Will expand scale and scope with \$2.9 million grant from California Computer Refurbishing Fund**

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The Computer Recycling Center is a nonprofit organization based in Santa Clara, California. It accepts computer equipment of all sorts and in any condition from a wide range of individual and corporate donors. Using some paid staff and about 150 volunteers at its three sites in Northern California, the Center has refurbished an estimated 25,000 computers in the past three years for K-12 schools in California and neighboring states. Recipients pay only for delivery charges. Donors may specify recipients, although the Center prefers to make the determination according to need and intended application. With expanded facilities and a recent \$2.9 million grant from the California Computer Refurbishing Fund, the Center expects to increase its scale and scope of operations in 1997.

The Computer Recycling Center incorporates some unique approaches to recycling computers and transferring them to schools. In order to maximize the quantity of like equipment it transfers, the Center buys scrap computers in bulk from corporate liquidators. Donated or purchased equipment which is unusable for schools is either sold to the general public or further dismantled, sorted and sold as scrap materials. Funds from these sales are used to support their programs. The Center also goes beyond simply giving used computers to schools by assisting schools to develop technology plans and providing training, materials and other support for school vocational repair programs. The Computer Recycling Center is certified by the State of California to provide vocational training in computer repair.

Indiana "Buddy Up" Program

Self-financing state program for computer recycling

- **\$125 special state tax credit for donated computers meeting minimum standards (386 or better)**
 - Eli Lilly, Ameritech are primary computer donors
 - donors cannot specify school recipients
- **Donations received and refurbished by state-run Educational Service Centers**
- **Computers offered to Indiana K-12 schools at "cost," which averages \$425 (including the tax credit)**
 - schools asked for utilization plan and forecast
- **Program hopes to place ~3000 computers in 1997**

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The Indiana Buddy Up Program is a self-financed state program established in 1992 to refurbish donated used computers and resell them at cost to K-12 schools in Indiana. It is operated by the Indiana State Board of Education, the nonprofit Corporation for Educational Technology and the state's nine Educational Service Centers.

Donors receive a special \$125 state tax credit for computers in working condition that meet minimum Buddy Up requirements (currently 386 or 68030 processor, or better). Minor repairs and upgrades (e.g., adding more memory or a color monitor) are made by paid staff at the Central Indiana Educational Service Center, and the computers are loaded with Windows and Microsoft Works software, for which the program has a wholesale license. The Service Center sends regular mailings to schools describing the recycled computers that are available and also lists them on the Internet. Schools can purchase them at cost -- currently \$395-\$435 including parts and labor, program administration and the \$125 tax credit. Donors cannot select the recipients.

The Buddy Up program initially was intended to offer recycled computers to parents as well as schools, but so far the demand from schools has exceeded the available supply.

East-West Education Development Foundation

Program initially developed to provide computers to the former Soviet Union; now focuses on U.S.

- **Receives donations from firms and individuals**
 - will accept broken equipment, parts
 - Foundation operates refurbishing center
- **Provides computers to schools and nonprofits at cost**
 - \$150 for 386, \$325 for 486; \$690 for 586
 - 70% go to U.S. recipients; 30% international
 - donors often pay costs and select recipients
- **Expects to recycle 5000 computers in 1997**

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The East-West Education Development Foundation in Boston, MA was established in 1990 to send used computers to democracy and human rights organizations in the former Soviet Union, but now distributes 70 percent of its output to schools and nonprofit organizations in the United States. It expects to place about 5000 remanufactured computers with U.S. recipients in 1997.

The foundation will accept all computer donations from individuals or corporations. It "remanufactures" computers at its own facility, using both paid staff and volunteers (each remanufactured computer requires about four donated machines, according to the marketing director). Excess materials are sold as scrap, and the remanufactured computers are provided to recipients at cost – currently \$50 for a 286, \$150 for a 386, \$325 for a 486 and \$690 for a 586 or pentium-class machine. The foundation has a large waiting list of interested recipients throughout the United States, split roughly 50-50 between schools and other nonprofits. Donors can specify the recipients if they pay for the refurbishing costs. In some cases, East-West will assist recipients in finding sponsors to cover these costs.

Lazarus Foundation

Recycles computers for schools and nonprofits in the Baltimore area

- **Much smaller scale than other three recyclers**
- **Accepts older and broken equipment; more than 50% of computers received in 1996 were 286**
- **Volunteers repair and refurbish equipment, which is provided to schools and nonprofits at repair cost**
- **Held "Tech Day" in 1996 for schools in Baltimore Empowerment Zone**
 - **400 computers donated by federal agencies**
 - **120-130 refurbished and given free to EZ schools**

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Although the Lazarus Foundation operates at a smaller scale than the previously described recyclers, it is included because it has worked with federal agencies in the Baltimore, MD and suburban Washington, DC areas. The foundation accepts donations of 286 or better computer equipment in any condition -- more than 50 percent of the computers it received in 1996 had 286 processors. Volunteers meet once a month in donated shop space in Columbia, MD to repair the donated machines, which are then provided at cost (an average \$300 for an upgraded 386) to schools and nonprofits. Recipients generally specify in advance the upgrades required to meet their needs and budget.

In 1996 the foundation co-hosted a "National Computer Recycling Conference," which a number of federal employees attended, and which included a "Tech Day '96" donation event. Lazarus later sponsored a "Tech Day II" in Baltimore, aimed at recycling computers for schools in the Baltimore Empowerment Zone. Federal agencies donated about 400 used computers during that event, of which about 125 were refurbished at no charge and the rest given as-is to the Baltimore School System.

Recycling Program Comparisons

<u>Program</u>	<u>Est. # to be placed in 1997</u>	<u>Recipients</u>	<u>Recipient pays costs?</u>
Detwiler/California Refurbishing Fund	30,000	California schools	no
Comp. Recycling Ctr/ Calif. Refurbish. Fd.	15,000	CA schools, nonprofits	no
Indiana Buddy Up Program	3,000	Indiana schools	yes
East-West Ed. Dev. Foundation	5,000	schools, nonprofits	yes
Lazarus Foundation	<1,000	MD schools, nonprofits	yes

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This chart compares the five recycling organization in terms of the number of computer systems each expects to transfer in 1997, the principal recipients, and whether or not recipients pay for the equipment they receive.

We next turn to two of the largest intermediary organizations that do not operate recycling programs.

Other Intermediary Organizations Facilitate Computer Donations to Schools

Gifts In Kind America

- Gives products from corporate donors to nonprofits
- Accepts only working equipment; no refurbishing
- 25% school recipients; 75% other nonprofits
- Charges recipients \$75 for shipping and handling

National Cristina Foundation

- Links nonprofit recipients to corporate donors
- Helps nonprofits prepare technology plans
- Does not physically handle equipment; no fees
- About 50% school recipients

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Gifts In Kind acts as an intermediary for corporations that want to donate manufactured products to nonprofits and schools. It deals mostly with new product donations, but since 1990 it has also warehoused and distributed used computers. The computers must be in good working order; Gifts In Kind does no inspection, repair or refurbishing. Gifts In Kind helps donors identify appropriate recipients. It maintains a register of some 50,000 qualified recipients, mails them a monthly listing of the equipment it has available, and administratively processes requests and shipments. If donors do not pay the costs, it charges recipients a nominal fee (\$75) for shipping and handling. Although it has not aggressively marketed recycled computers, Gifts In Kind estimates it has distributed about 10,000 used computers in the past three years and expects to double that number in 1997. About 25 percent of the used computers have gone to schools.

The National Cristina Foundation also links donors of used computer equipment with school, public agency and nonprofit recipients. It sees its roles as helping recipients define their technology needs and share solutions, facilitating communications between donors and recipients, and keeping track of the equipment transfers. Its guidelines for donors do not require refurbishing or warranties, but state that all equipment must be "usable." The Foundation maintains a register of qualified recipients, about half of which are schools; and it channels some donations through community recycling programs. National Cristina expects to broker some 30,000 donated items -- mostly computers, but also peripherals and related equipment -- in 1997.

Recycling Program Comparisons

<u>Program</u>	<u>Est. # to be placed in 1997</u>	<u>Recipients</u>	<u>Recipient pays costs?</u>
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Comp. Recycling Ctr.	15,000	CA schools	no
Indiana Buddy Up	3,000	IN schools	yes
East-West Ed. Dev. Foundation	5,000	US schools, nonprofits	yes
Lazarus Foundation	<1,000	MD schools, nonprofits	yes
Gifts In Kind	20,000	25% schools	\$75
Nat'l Cristina Fnd	30,000	50% schools	no

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These two intermediary organizations alone expect to distribute 50,000 computers in 1997, of which about 20,000 will go to K-12 schools. The five recycling organizations listed above expect to place about 50,000 computers in schools. Although we do not have output figures for the hundreds-to-thousands of other organizations involved in computer recycling, we would conservatively estimate that recycling and intermediary organizations overall will be responsible for placing more than 100,000 computers in schools in 1997. This represents at least 10 percent of the computers that K-12 schools will acquire this year.

Recycling Organizations Offer Advantages, But Other Approaches Also Seem Feasible

- Recycling organizations can operate at larger scale than can individual donors or recipients
 - likely to have lower costs, more consistent output
 - can negotiate better software licenses
 - may have greater educational impact
- But schools can also benefit from running their own recycling operations
 - vocational students learn marketable skills
 - more control over placement of equipment
- L.A. County schools establishing community partnerships for refurbishing (an untested model)

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Independent recycling organizations can operate at larger scale than can individual donors or recipients, which give them potential advantages in terms of lower operating costs per unit; more consistent output (assuming adequate inputs of donated equipment); the ability to negotiate better software licenses; wider distribution; and better knowledge of recipients' needs.

Of course, realizing these potential advantages requires operating capital and good management, which are always in limited supply. Nonetheless, recyclers who transfer thousands of good-quality computer systems annually may well have greater educational impact than do smaller donation programs.

However, school districts may want to run their own refurbishing operations as part of their vocational education programs, both to help vocational students learn marketable skills, and to exercise greater control over placement of the refurbished equipment. Other models for refurbishing may also prove feasible. The Los Angeles County Office of Education, for example, is working to establish community refurbishing partnerships that will train out-of-work and other low income residents in computer repair skills. Such partnerships deserve further study as alternative models for refurbishing donated computers before transferring them to schools.

Outline of Presentation

- Study background and approach
- Benefits of computer donations
- Direct donation and refurbishment programs
- Approaches to recycling and refurbishment
- **Summary and final observations**

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Summary of Lessons Learned From Nonfederal Computer Donation Programs

- Schools can benefit from donated computers
- Transferring equipment in good working order is essential
- Refurbishing provides more and better equipment for schools
- Independent recycling organizations can operate at larger scale than can individual donors or recipients
- Recycling organizations offer advantages, but other approaches to refurbishment also seem feasible

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This chart recaps the principal findings from our review of private sector, nonprofit and state government programs to donate used computers to elementary and secondary schools. It reiterates the importance of refurbishing donated equipment so that teachers and other school users receive it in good working order.

Although independent recycling organizations offer economies of scale, consistency of output and some administrative advantages, donors or recipients can also take responsibility for refurbishing and upgrading donated computers. It is by no means clear, however, that federal government agencies have the administrative flexibility and resources to effectively refurbish and upgrade their surplus computers before transferring them to schools. Consequently, if the administrative problems of dealing with recycling organizations can be resolved, recyclers have the potential to increase the quantity and quality of federal donations that are usable in the classroom.

Some Final Observations

- Donations can help schools get capable computers faster, but don't substitute for new purchases
- Private programs have changed appreciably in past two years; but for some schools, accepting used equipment still carries stigma of prior problems
- Recycling makes accountability more complex
 - more difficult to trace donations to final recipient when parts are cannibalized or intermixed
 - California requires extensive record keeping by refurbishers to account for State funds
- Internet has untapped potential to match donors and recipients

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We conclude with a few other observations. Based on this review of nonfederal donation programs, we believe that computer donations can help bring technology into classrooms; but by no means is it the solution to the school "computer gap." In particular, donations of used equipment should not substitute for funds to purchase new hardware and software, or to train teachers in using these systems effectively. School officials often expressed such concerns to us.

Some teachers and administrators also voiced their concerns about schools being relegated to second-class status when they use donated rather than new equipment. In fact, new educational software and the Internet demand more advanced hardware than do many business applications. However, some of the problems we heard about seem more characteristic of earlier direct donations than of refurbished and upgraded computers recently transferred by recyclers. While recycling is no panacea, the larger recyclers we interviewed are well aware of classroom needs for capable computers and now concentrate their output on multimedia, Internet-ready machines.

Recycling does make donation accounting more complex, especially when parts from different donated machines are reassembled into others. Private sector donors were not much concerned about this, but federal and state programs need to develop both clear and flexible accountability guidelines to accommodate recycling, as California has done with the Computer Refurbishing Fund.

Finally, we believe that the Internet itself can be used more effectively by donors, school recipients and intermediaries to inform and match the supply of and demand for donated equipment. This topic is beyond the scope of this review, but we believe it is well worth further attention.

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